

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/513,207	LI ET AL.
	Examiner	Art Unit
	Arlen Soderquist	1743

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTO-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to the papers filed 6-23-04.
2.  The allowed claim(s) is/are 1-6,8-12 and 14-22.
3.  The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
 of the:
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review ( PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_.
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Robert C. Stanley on August 25, 2004.

2. The claims in the application has been amended as follows:

Claim 1 (currently amended) A method for simultaneously determining multiple individual chemical concentrations of an undiluted liquid kraft liquor stream comprising:

providing an undiluted liquid kraft liquor stream;

subjecting at least a segment of the stream to ultraviolet light wherein the light penetrates a short distance into the segment and the effective path length of the light is a function of the refractive index of the segment;

generating an ultraviolet absorption spectrum from the ultraviolet penetration of the sample over a wavelength from 190 to 300 nm; and

analyzing the ultraviolet absorption spectrum by a regression method to determine the multiple component concentrations of the liquid stream;

wherein the sample is subjected to ultraviolet light by an attenuated total reflectance device configured for preventing ultraviolet absorbance by the device below 210 nm.

Claim 2 (previously presented) A method according to claim 1 wherein the attenuated total reflectance device is an ATR-UV optical probe.

Claim 3 (previously presented) A method according to claim 1 wherein the attenuated total reflectance device is an ATR-UV tunnel flow cell.

Claim 4 (original) A method according to claim 1 wherein the regression method is multivariate.

Claim 5 (original) A method according to claim 4 wherein the multivariate regression method is the partial least squares method.

Claim 6 (original): A method according to claim 1 wherein the regression method is linear.

Claim 7 (canceled).

Claim 8 (previously presented) A method according to claim 1 wherein the measured individual chemical concentrations of the kraft liquor are selected from sodium hydroxide, sodium sulfide, and sodium carbonate.

Claim 9 (previously presented) A method for simultaneously determining the sodium hydroxide, sodium sulfide, and sodium carbonate concentrations of a kraft liquor stream comprising:

- providing a kraft liquor stream;
- generating an ATR-UV absorbency spectrum of the liquor over a wavelength of 190 to 300 nm;
- analyzing the ultraviolet absorption spectrum by a regression method to determine the concentrations of sodium hydroxide, sodium sulfide, and sodium carbonate in the kraft liquor stream.

Claim 10 (previously presented) A method according to claim 9, further comprising controlling operation of a kraft cooking digester recausticizing unit, white liquor oxidization reactor or chemical recovery furnace in response to the determined sodium hydroxide, sodium sulfide, and sodium carbonate concentrations.

Claim 11 (currently amended) A system for simultaneously determining multiple individual chemical concentrations of a liquid kraft pulp stream comprising:

- an undiluted liquid kraft liquor stream source,
- an ultraviolet spectrophotometer in cooperative relationship with a device in direct communication with the undiluted liquid kraft liquor stream and capable of providing ultraviolet absorption data between 190 and 300 nm from the undiluted liquid kraft liquor stream, and
- a multivariate or linear calibration program for analyzing the provided ultraviolet absorption data, wherein the device is an attenuated total reflectance device configured for preventing ultraviolet absorbance by the device below 210 nm.

Claim 12 (previously presented) A system according to claim 11 wherein the attenuated total reflectance device is an ATR-UV optical probe.

Claim 13 (canceled).

Claim 14 (previously presented) A system according to claim 11 wherein the attenuated total reflectance device is an ATR-UV tunnel flow cell.

Claim 15 (previously presented) A system according to claim 14 wherein the ATR-UV tunnel flow cell is installed in the ultraviolet spectrometer and the liquid kraft pulp stream flows through the ATR-UV tunnel flow cell.

Claim 16 (currently amended) A system for determining chemical concentrations of NaOH and Na<sub>2</sub>CO<sub>3</sub> in a kraft liquor stream comprising:

an ultraviolet spectrometer,

an attenuated total reflectance device capable of providing ultraviolet absorption data between 190 and 300 nm and configured for preventing ultraviolet absorbance by the device below 210 nm, wherein the attenuated total reflectance device transmits the ultraviolet absorption data to the ultraviolet spectrometer by fiber optic cable, and

a multivariate or linear calibration program for analyzing the ultraviolet absorption data.

Claim 17 (previously presented) A system according to claim 16 wherein the attenuated total reflectance device is an ATR-UV optical probe installed in a kraft liquor stream.

Claim 18 (previously presented): A system according to claim 16 wherein the attenuated total reflectance device is an ATR-UV tunnel flow cell installed in the ultraviolet spectrometer and a kraft liquor stream flows through the ATR-UV tunnel flow cell.

Claim 19 (previously presented) The system according to claim 18, wherein the ATR-UV tunnel flow cell comprises a pump and the kraft liquor stream is pumped through the ATR-UV tunnel flow cell.

Claim 20 (previously presented) The system according to claim 15, wherein the ATR-UV tunnel flow cell comprises a pump and the liquid kraft pulp stream is pumped through the ATR-UV tunnel flow cell.

Claim 21 (previously presented) The system according to claim 18, further comprising a light source which directs light through the ATR-UV tunnel flow cell to the ultraviolet spectrometer.

Claim 22 (previously presented): The system according to claim 15, further comprising a light source which directs light through the ATR-UV tunnel flow cell to the ultraviolet spectrometer.

Claims 23-24 (canceled).

3. The following is an examiner's statement of reasons for allowance: for claims not previously allowed, examiner is accepting the declaration under 37 CFR 1.131 establishing the date of invention prior to the publication date of the Doyle reference. Examiner is also accepting applicant's argument that the prior art does not teach an ATR-UV device in a kraft liquor environment that provided an acceptable signal in the claimed wavelength range below 210 or motivation to modify a method or device for simultaneously determining multiple individual chemical concentrations in an undiluted kraft liquor stream. In this respect the newly cited Cole, Jr. reference teaches synthetic fused silica as a fiber optic material, but fails to teach or suggest its use or suitability for measuring an ultraviolet absorbance spectrum in a liquid kraft liquor stream in the claimed wavelength range.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additionally cited art relates to fiber optic materials, ATR flow tunnels and probes and monitoring polysulfides in a kraft liquor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose current telephone number is (571) 272-1265 as a result of the examiner moving to the new USPTO location. The examiner's schedule is variable between the hours of about 5:30 AM to about 5:00 PM on Monday through Thursday and alternate Fridays.

A general phone number for the organization to which this application is assigned is (571) 272-1700. The fax phone number to file official papers for this application or proceeding is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Arlen Soderquist  
August 26, 2004  
ARLEN SODERQUIST  
PRIMARY EXAMINER